JOURNAL OF APPLIED MATHEMATICS AND MECHANICS

PRIKLADNAYA MATEMATIKA I MEKHANIKA

LIST OF CONTENTS AND AUTHOR INDEX
VOLUME 58, 1994

PERGAMON

APPLIED MATHEMATICS AND MECHANICS

The *Journal of Applied Mathematics and Mechanics* is translated cover to cover (Russian original copyright: Nauka, 90 Profsoyuznaya ul., Moscow 117864) and has been published by Pergamon since 1958.

Translation Editors:

Professor G. HERRMANN, Stanford University, CA, U.S.A.

R. C. GLASS, City University, London, U.K.

Panel of Translators

R. C. GLASS, Yu. P. GUPALO, D. LOUVISH, E. L. SHORT, A. SUMBATOV, T. J. ZASTAWNIAK, R. L. ZNAJEK

PRIKLADNAYA MATEMATIKA I MEKHANIKA

Russian Academy of Sciences

Editorial Board

V. V. RUMYANTSEV (Editor-in-Chief)
Yu. P. GUPALO (Deputy Editor)

F. L. CHERNOUS'KO
G. G. CHERNYI
K. V. FROLOV
S. S. GRIGORYAN
A. A. IL'YUSHIN
A. Yu. ISHLINSKII
P. Ya. KOCHINA
N. N. KRASOVSKII
I. F. OBRAZTSOV
Yu. S. OSIPOV
L. V. OVSYANNIKOV
L. I. SEDOV
N. S. SOLOMENKO
V. V. STRUMINSKII
G. A. TIRSKII

Editorial Advisory Board

V. M. ALEKSANDROV
S. A. AMBARTSUMYAN
I. I. BLEKHMAN
V. V. BOLOTIN
V. G. DEMIN
A. A. DORODNITSYN
A. L. GOL'DENVEIZER
D. D. IVLEV
A. V. KARAPETYAN
S. A. KHRISTIANOVICH
V. B. KOLMANOVSKII
V. V. KOZLOV
A. N. KRAIKO
A. G. KULIKOVSKII
V. B. LIDSKII
G. A. LYUBIMOV
V. M. MATROSOV
N. N. MOISEYEV
V. I. MOSSAKOVSKII
D. E. OKHOTSIMSKII
V. Z. PARTON
G. I. PETRASHEN'
B. E. POBEDRYA
G. Ya. POPOV
V. L. RVACHEV
V. N. RUBANOVSKII
O. S. RYZHOV
Yu. S. RYAZANTSEV
G. Yu. STEPANOV
A. I. SUBBOTIN
V. V. SYCHEV
I. I. VOROVICH
N. V. ZVOLINSKII

Copyright © 1995 Elsevier Science Ltd. Published 6 issues per annum.

Annual Institutional Subscription Rate 1995 (English translation of Vol. 59): North, Central and South America U.S.$1230.00, Rest of World £825.00. Sterling prices exclude VAT. Non-VAT registered customers in the European Community will be charged the appropriate VAT in addition to the price listed. Prices include postage and insurance, and are subject to change without notice.

Subscription enquiries from customers in North America should be sent to: Elsevier Science Inc., 660 White Plains Road, Tarrytown, NY 10591-5153, U.S.A., and for the remainder of the world to: Elsevier Science Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, U.K. Tel. (01865) 843000. Fax. (01865) 843010.

Back issues of all previously published volumes, both in hard copy and on microform, are available direct from Elsevier Science offices (Oxford, New York).

Second class postage paid at NEWARK, NJ. Postmaster send address corrections to *Journal of Applied Mathematics and Mechanics*, c/o Elsevier Science Inc., 660 White Plains Road, Tarrytown, NY 10591-5153, U.S.A.

VOLUME CONTENTS

VOLUME 58 1994 NUMBER 1

V. N. TKHAI: Some problems of the stability of a reversible system with a small parameter 1

V. V. BELETSKII and A. V. GRUSHEVSKII: The evolution of the rotational motion of a satellite under the action of a dissipative aerodynamic moment 11

M. Z. YENSEBAYEVA and A. D. MYSHKIS: The kinematics of the rolling of a rigid body along two lines 21

V. V. LUNEV: Meromorphic solutions of the equations of motion of a heavy solid with a fixed point 31

A. V. MARCHENKO: A model of a drifting ice cover 43

N. B. IL'INSKII and D. A. FOKIN: The design of cavitation-free hydroprofiles based on the solution of a mixed inverse boundary-value problem 59

F. A. KRIVOSHEI: A model of the two-velocity motion of a barotropic two-phase medium 67

V. V. LYAKH and S. P. MINEYEV: Mathematical modelling of the action of vibrations on a gas-saturated coal seam 73

B. Ye. POBEDRYA: The problem in terms of a stress tensor for an anisotropic medium 81

Yu. V. ZELENEV and O. I. MEDVEDKOV: On the description of the stress–strain state of a wedge-shaped plate 91

Yu. I. VINOGRADOV and G. B. MEN'KOV: Functional normalization for the solution of boundary-value problems for cylindrical shells 97

L. D. AKULENKO and S. V. NESTEROV: Parametric oscillations of a membrane in an alternating electric field 101

L. A. ALEKSEYEVA: Somigliani's formulae for solving the elastodynamic equations for travelling loads 109

M. M. KHASANOV: Scale-invariance of time hierarchies in viscoelastic media relaxation processes 117

Ye. V. KOVALENKO: Modelling the contact interaction between rough bodies in the presence of a lubricant 123

S. M. MKHITARYAN: The impression of a strip-like punch into a half-space which deforms exponentially 133

V. M. ALEKSANDROV and D. A. POZHARSKII: Contact stresses at the apex of a wedge-shaped punch pressed upon the edge of an elastic three-dimensional wedge 143

S. I. REPIN: The solutions of problems in the mathematical theory of plasticity with discontinuities in the displacement fields 149

I. M. LAVIT: Boundary integral equation for a curvilinear boundary crack 161

A. A. LOKSHIN: The head wave at the boundary of two hereditary-elastic half-spaces. The case of a linear source 171

I. V. PANFEROV: The deformation of a cone of transversally isotropic material by the action of temperature and an axial force 177

D. V. GEORGIYEVSKII: The stability of a plane ideal rigid–plastic Couette flow 183

Contents of next issue I

VOLUME 58 1994 NUMBER 2

L. I. SEDOV: Properties of the invariant components of the Weyl tensor implied by the Bianchi identities 189

L. D. AKULENKO: The perturbed time-optimal problem of controlling the final position of a material point by means of a limited force 197

A. M. TARAS'YEV: Approximation schemes for constructing minimax solutions of Hamilton–Jacobi equations 207

V. A. PRIVALOV and V. A. SAMSONOV: Comparison of the stability properties of two autorotating motions 223

V. V. NIKULIN: A hollow vortex with an axial velocity in a tube of variable radius 235

E. N. POTETYUNKO: Plane waves on a liquid surface with harmonic perturbations of boundary components 241
A. P. BLINOV: The shape of the surface of a fluid under conditions of weightlessness 249
A. V. LATYSHEV and A. A. YUSHKANOV: An analytic solution of the problem of the temperature jumps and vapour density over a surface when there is a temperature gradient 259
S. L. DERYABIN and N. P. CHUYEV: Spherically symmetric escape of a self-gravitating ideal gas into a vacuum 267
A. G. GORSHKOV, D. V. TARLAKOVSKII and A. M. SHUKUROV: Unsteady vibrations of an elastic medium bounded by two eccentric spherical surfaces 275
V. V. VASIL'YEV: Mechanical sweep method for calculating the non-linear deformation of a cylindrical panel 283
A. G. KOLPAKOV: The stiffness of elastic cylindrical beams 293
I. I. ARGATOV and S. A. NAZAROV: Asymptotic solution to the problem of an elastic body lying on several small supports 303
S. I. BOYEV, I. I. VOROVICH and I. B. POLYAKOVA: Some properties of the dynamics of a punch–layer system: an energy analysis 313
O. D. PRYAKHINA and M. R. FREIGEIT: The solution of unsteady contact problems in the presence of coupling forces 323
V. K. OPANASOVICH, L. O. TISOVSKII and I. I. FEDIK: The temperature field and thermoelastic state of a plate with a periodic system of thin elastic inclusions 335
L. N. GERMANOVICH, M. V. DOLOTOV and I. D. KILL': The dynamic problem of thermoelasticity for a half-space with distributed heat sources in the case of axial symmetry 343
L. A. FIL'SHTINSKII and M. L. FIL'SHTINSKII: Green's function for a composite piezoceramic plane with a crack between phases 355
S. E. KHOLODOVSKII: Integral representation of potentials in media with adjoining annular cracks and screens 363
L. A. ALEKSEYEVA and G. K. ZAKIR'YANOVA: Dynamic analogues of Somigliana's formula for unsteady dynamics of elastic media with an arbitrary degree of anisotropy 367
Contents of next issue 1

VOLUME 58 1994 NUMBER 3

V. V. RUMYANTSEV: On the Poincaré–Chetayev equations 373
A. V. KARAPETYAN: Specific features of the application of Routh's theory to systems with differential constraints 387
L. D. AKULENKO: Asymptotic analysis of dynamical systems subjected to high-frequency interactions 393
T. D. KONASHENKOVA and N. K. MOSHCHUK: Stochastic mechanical systems with a non-retaining constraint 403
A. D. MOROZOV: Resonances and chaos in parametric systems 413
I. V. BOIKOV: Aizerman's problem 425
A. V. KIRGETOV: The problem of constructing Lyapunov's reducing transformation 429
A. P. IVANOV: The dynamics of systems near to grazing collision 437
A. P. MARKEYEV: An investigation of the stability of the periodic motion of a rigid body when there are collisions with a horizontal plane 445
V. I. VOROTNIKOV: The control of the angular motion of a solid with interference. A game-theoretic approach 457
R. R. GADYL'SHIN: Systems of acoustic resonators in the quasistationary mode 477
B. S. CHEKIN: The inclined entry of a thin wedge into an incompressible fluid 487
S. V. ZHLUKTOV, G. A. TIRSKII and S. V. UTYUZHNIKOV: A thermally non-equilibrium viscous shock layer past slender blunted cones 493
V. S. ZHIROV: Optimization of the mass of a wing 507
Ye I. SVESHNIKOVA: Shock waves in a weakly anisotropic elastic incompressible material 521
A. V. SHANIN: Application of the theories of representations to the problems of the excitation and reflection of wedge waves 531
I. I. VOROVICH, D. A. POZHARSKII and M. I. CHEBAKOV: The thermoelasticity of a moving punch when the heat release from friction is taken into account 539
A. A. IL'YUSHIN and I. A. KIIKO: A new formulation of the problem of the flutter of a hollow shell 545

A. A. KOSMODEM'YANSKII Jr: Calculation of the boundary derivatives of the solutions of the first and second boundary-value problems for Poisson's equation 551
P. V. TRET'YAKOV: The diffraction of an arbitrary acoustic wave by a block 559
V. S. POLENOV and A. V. CHIGAREV: Propagation of waves in an inhomogeneous viscoelastic medium with initial stresses 563
A. E. PURO: The use of the method of integrated photoelasticity to determine the stresses in a cubic single crystal 569
Contents of next issue I

VOLUME 58 1994 NUMBER 4

Announcement to authors and readers of the *Journal of Applied Mathematics and Mechanics* 573
G. G. GARNYSHEVA and A. I. SUBBOTIN: Strategies of minimax aiming in the direction of the quasigradient 575
P. V. PROKOPOVICH and A. A. CHIKRII: A linear evasion problem for interacting groups of objects 583
N. N. PETROV: Existence of the value of a many-person game of pursuit 593
L. V. OVSYANNIKOV: The "PODMODELI" program. Gas dynamics 601
S. V. MELESHKO: Group classification of the equations of two-dimensional motions of a gas 629
S. L. TONKONOG, V. A. CHUGUNOV and L. D. ESKIN: Methods of group-theoretic analysis in the problem of the sliding motion of a spreading thin film of non-linearly viscous liquid 637
A. N. KRAIKO: The asymptotic features of the unsteady expansion of an ideal gas into a vacuum 645
A. F. SIDOROV and O. B. KHAIRULLINA: Shock-free conical compression and expansion of a gas 657
L. M. ZINGANGAREYEVA and O. M. KISELEV: Calculation of the cavitating flow around a circular cone by a subsonic stream of a compressible fluid 669
V. Yu. LYAPIDEVSKII: Blocking of the flow of a two-layer mixing liquid around an obstacle 685
D. G. POLONSKII and A. A. SHAPIRO: Stability of the discontinuity front in multiphase multicomponent displacement 691
V. M. ALEKSANDROV and S. A. GRISHIN: Dynamics of a conical shell containing supersonic gas flow 703
N. G. MOISEYEV and G. Ya. POPOV: The antiplane problem of a crack with edges touching planes where the constants of elasticity change 713
M. A. GREKOV: The plane problem for a crack between two linearly elastic media 727
M. L. FIL'SHTINSKII: The unsteady dynamic problem of electroelasticity for an unbounded medium with curvilinear tunnel cracks 741
S. K. BETYAYEV, A. M. GAIFULLIN and S. V. GORDEYEV: The point-circle vortex 749
O. Yu. DINARIYEV: The pressure build-up curve for a fractal cracked porous medium. Linear theory 755
Contents of next issue I

VOLUME 58 1994 NUMBER 5

L. I. SEDOV: Comoving and inertial frames of reference 759
A. P. IVANOV: The effect of small resistive forces on relative equilibrium 777
V. V. KOZLOV: The asymptotic motions of systems with dissipation 787
A. P. MARKEYEV: Third-order resonance in a Hamiltonian system with one degree of freedom 793
A. P. SEIRANYAN: Collision of eigenvalues in linear oscillatory systems 805
V. M. KUNTSEVICH and V. G. POKOTILO: Invariant set stability in discrete non-linear systems 815
Ye. V. ABRAROVA and A. V. KARAPETYAN: Steady motions of a rigid body in a central gravitational field 825
N. K. MOSHCHUK: The motion of a randomly perturbed Chaplygin sledge 831
N. N. BOLOTNIK: Inertial motion of an absolutely rigid body on a two-degrees-of-freedom joint 841
S. V. BOGATYREV: Slow motions in problems of the dynamics of a solid with a cavity filled with a viscous liquid 849

S. V. MELESHKO: Homogeneous autonomous systems with three independent variables 857
A. A. KOSTOGLOTOV and V. N. TARAN: The use of the predictive-model method to solve inverse problems of gas dynamics 865
M. M. ALIMOV, K. G. KORNEV and G. L. MUKHAMADULLINA: The equilibrium shape of an ice–soil body formed by liquid flow past a pair of freezing columns 873
N. F. MOROZOV and V. G. OSMOLOVSKII: The formulation and an existence theorem for a variational problem on phase transitions in continuous medium mechanics 889
V. Ya. TERESHCHENKO: Modelling the singularities in the solution of problems in the theory of elasticity 897
N. V. DUNSKAYA and Ye. S. PYATNITSKII: Synthesis of a generating system in the problem of controlling an elastic rod 905
D. A. POZHARSKII: A spatial problem for an elastic wedge with a strip cut 913
V. B. PEN'KOV: On a closing crack 919
M. A. NOVIKOV: On the stability of the permanent rotations of a rigid body about a fixed point in Brun's problem 927
V. G. VERBITSKII and L. G. LOBAS: Bifurcations of steady states in systems with rolling under constant force perturbations 933
A. V. KOIBIN: Torsional vibration in an elastic rod with external dry friction 941
Contents of next issue I

VOLUME 58 1994 NUMBER 6

V. M. MATROSOV and I. A. FINOGENKO: The solvability of the equations of motion of mechanical systems with sliding friction 945
Ye. B. KUZNETSOV and V. I. SHALASHILIN: The Cauchy problem for mechanical systems with a finite number of degrees of freedom as a problem of continuation on the best parameter 955
A. A. VORONIN: Asymptotic properties of the solutions of the equations of motion of gyroscopic systems 963
G. N. MIL'SHTEIN and O. E. SOLOV'YEVA: The construction of filters in non-linear deterministic systems 971
Yu. K. ZOTOV and A. V. TIMOFEYEV: Methods of stabilizing the motions of reversible dynamic systems using non-linear canonical transformations 983
V. I. UKHOBOTOV: Domain of indifference in single-type differential games of retention in a bounded time interval 997
V. M. ZHURAVLEV: A new representation of the two-dimensional equations of the dynamics of an incompressible fluid 1003
V. N. DIYESPEROV: Some solutions of Karman's equation describing the transonic flow past a corner point on a profile with a curvilinear generatrix 1011
O. Yu. DINARIYEV: Multicomponent steady flows in porous media with phase transitions 1021
A. S. BRATUS': The properties of solutions of a class of isoperimetric problems of stability optimization 1029
A. L. GOL'DENVEIZER: Algorithms of the asymptotic construction of linear, two-dimensional thin shell theory and the St Venant principle 1039
A. V. BAUL: The effect of the Batdorf parameter on the post-critical behaviour of an axially compressed imperfect cylindrical shell 1051
A. I. MANEVICH: Interaction of coupled modes accompanying non-linear flexural vibrations of a circular ring 1061
N. V. GENERALOVA and Ye. V. KOVALENKO: On the contact interaction between a strip-shaped punch and a linearly-deformable base through a covering of variable thickness 1069
M. V. DERYABIN: The realization of unilateral constraints 1079
A. D. MYSHKIS: Systems with after-effect and relaxation 1085
S. P. SOSNITSKII: Hamilton action as a function of phase variables 1089
E. L. AMROMIN: An estimate of the radius of the viscous core of a vortex 1095
B. V. BUDAYEV, N. F. MOROZOV and M. A. NARBUT: Torsion of a circular cone with static and dynamic loading 1097
K. Yu. VOLOKH: On the classical theory of plates 1101
A. A. LOKSHIN: Non-linear reflection of a plane wave in an elastic medium 1111
Contents of next issue I
Volume Contents/Author Index to Volume 58 III